

WHAT IS CLAIMED IS:

1. A method for recovering acetone from a waste stream from an acetone purification stage, wherein said waste stream comprises mesityl oxide, said method comprising:

i) separating said waste stream in a separating device into at least a first stream comprising mesityl oxide;

ii) concentrating said mesityl oxide, thereby producing concentrated mesityl oxide stream;

iii) recycling said concentrated mesityl oxide stream into said separating device; and

iv) bringing said concentrated mesityl oxide stream into contact with a basic or acidic aqueous medium, or with an acidic catalyst in the presence of water, whereby mesityl oxide is at least partially hydrolyzed to acetone.

2. The method of Claim 1, wherein said waste stream further comprises acetone.

3. The method of Claim 1, wherein said waste stream is further separated into at least a second stream comprising acetone.

4. The method of Claim 1, wherein said concentrating of mesityl oxide is achieved by distillation.

5. The method of Claim 1, wherein said concentrated mesityl oxide stream comprises at least 20% by weight of mesityl oxide.

6. The method of Claim 5, wherein said concentrated mesityl oxide stream comprises at least between about 50% and about 85% by weight of mesityl oxide.

7. The method of Claim 5, wherein said concentrated mesityl oxide stream is mixed with water and is contacted in said separating device with an acidic catalyst.

8. The method of Claim 7, wherein said acidic catalyst is an immobilized heterogeneous catalyst.

9. The method of Claim 1, wherein said separating device is a distillation column.

10. The method of Claim 1, wherein said basic or acidic aqueous medium is separately fed to the separating device.

11. The method of Claim 1, wherein said basic or acidic aqueous medium is already present in the waste stream.

12. The method of Claim 11, wherein said basic or acidic medium comprises at least about 0.1% by volume of said waste stream.

13. The method of Claim 11, wherein said waste stream further comprises one or more organic components having a boiling point higher than acetone, wherein said basic or acidic aqueous medium is a basic medium, said method further comprising:

a) continuously feeding said waste stream to a middle section of a first distillation column;

b) separating said waste stream in said first distillation column into:

b2) a side stream comprising mesityl oxide and said organic components, and

b3) a bottom stream comprising said basic aqueous medium;

c) continuously feeding said side stream b2) into a middle section of a second distillation column;

d) separating said side stream b2) in said second distillation column into:

d1) a top stream comprising acetone,

d2) a side stream comprising mesityl oxide, and

d3) a bottom stream comprising organic components having a boiling point higher than mesityl oxide; and

e) continuously recycling side stream d2) to the first distillation column through an entry point that is below a removal point for said side stream b2).

14. The method of Claim 13, wherein said separating said waste stream in said first distillation column additionally yields: b1) a top stream comprising acetone.

15. The method of Claim 13, wherein said side stream b2) further comprises residual acetone.

16. The method Claim 13, further comprising:

continuously feeding said side stream b2) to a decanter; and

separating said side stream b2) into:

an organic phase, wherein said organic phase is continuously fed to a middle section of said second distillation column; and

an aqueous phase, wherein said aqueous phase is at least partially recycled to said first distillation column.

17. The method of Claim 13, wherein said first distillation column comprises reaction trays, said method further comprising directing said side stream d2) comprising mesityl oxide onto at least one of said reaction trays.

18. The method of Claim 13, wherein a temperature at said entry point is between about 30°C and about 160°C.

19. The method of Claim 18, wherein said temperature at said entry point is between about 70°C and about 110°C.

20. The method of Claim 13, further comprising removing a second side stream d4) comprising organic components, said organic components having a boiling point lower than mesityl oxide, at a position upwards relative to a position of removal of said side stream d2).

21. The method of Claim 20, wherein said second side stream d4) comprises benzene.

22. The method of Claim 1, further comprising obtaining said waste stream from the acetone purification stage by:

obtaining crude acetone by the Hock process;

separating said crude acetone in a purification column by:

removing pure acetone as a head stream and

removing the waste stream as a bottom stream.

23. The method of Claim 22, wherein any recovered acetone streams are combined and recycled to said purification column.

24. A method of manufacturing phenol and acetone from cumene according to the Hock process comprising:

A) oxidizing said cumene to form cumene hydroperoxide;

B) subjecting said cumene hydroperoxide to acid-catalyzed cleavage thereby obtaining a cleavage phase comprising phenol and acetone;

C) separating phenol and crude acetone;

D) purifying said crude acetone from step C), thereby obtaining a pure acetone product stream and a waste stream; and

E) recovering acetone from said waste stream by the method of Claim 1.

25. The method of Claim 24, wherein the recovering E) comprises:

a) continuously feeding said waste stream to a middle section of a first distillation column;

b) separating said waste stream in said first distillation column into:

b2) a side stream comprising mesityl oxide and said organic components, and

b3) a bottom stream comprising said basic aqueous medium;

c) continuously feeding said side stream b2) into a middle section of a second distillation column;

d) separating said side stream b2) in said second distillation column into:

d1) a top stream comprising acetone,

d2) a side stream comprising mesityl oxide, and

d3) a bottom stream comprising organic components having a boiling point higher than mesityl oxide; and

e) continuously recycling side stream d2) to the first distillation column through an entry point that is below a removal point for said side stream b2), wherein said bottom stream d3) comprises cumene and said bottom stream d3) is recycled to the Hock process; and wherein said bottom stream b3) comprises a basic aqueous medium and further comprises less than about 2 wt% mesityl oxide and said bottom stream b3) is recycled to the work-up of acetone in the Hock process.

26. The method of Claim 25, wherein said bottom stream b3) comprises less than about 1 wt% mesityl oxide.